

FACSIMILE TRANSMITTAL FORM		Application Number	10/666212
		Filing Date	September 18, 2003
		First Named Inventor	Rosenflanz, Anatoly Z.
		Art Unit	1755
		Examiner Name	Karl E. Group
Fax: 571-273-8300		Attorney Docket Number	58807US002
Total Number of Pages in This Submission:		8	FEB 09 2006
Date: February 9, 2006	Attorney for Applicant: Gregory D. Allen		

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First Named Inventor: ROSENFLANZ, ANATOLY Z.

Application No.: 10/666212 Group Art Unit: 1755

Filed: September 18, 2003 Examiner: Karl E. Group

Title: CERAMICS COMPRISING AL₂O₃, REO, ZRO₂ AND/OR HFO₂, AND
Nb₂O₅ AND/OR TA₂O₅ AND METHODS OF MAKING THE SAMECOMMUNICATION REGARDING THE AMENDMENT AND RESPONSEUNDER 37 CFR § 1.111 DATED FEBRUARY 6, 2006

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February 9, 2006

Signed by: Jessica L. Nolan

Dear Sir:

In reviewing the instant Amendment and Response, it is believed that the following documents:

(a) *Phase Diagrams for Ceramists*, Ernest M. Levin, et al., Figs. 771-775, 1964.

(b) *Phase Diagrams for Ceramists 1975 Supplement*, Ernest M. Levin, et al., Figs. 4446-4448, 1975.

referred to on the bottom of page 19 and the top of page 20, were inadvertently not included with such paper. Enclosed herewith are these two documents.

Application No.: 10/666212

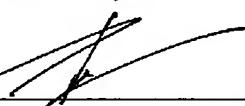
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It is believed that no extension of time or fee is due; however, in the event an extension of time is necessary, it is hereby requested, and in the event a fee is required, please charge the fee to Deposit Account No. 13-3723.

Respectfully submitted,

February 9, 2006
Date

By:


Gregory D. Allen, Reg. No.: 35,048
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Phase Diagrams for Ceramists 1975 Supplement

Ernest M. Levin and

Howard F. McMurdie

Compiled at the National Bureau of Standards

Margie K. Reser, *Editor*

The American Ceramic Society
65 Ceramic Drive, Columbus, Ohio 43214

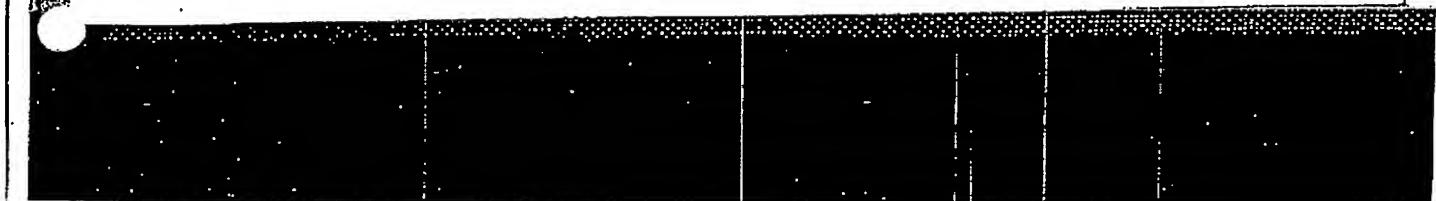
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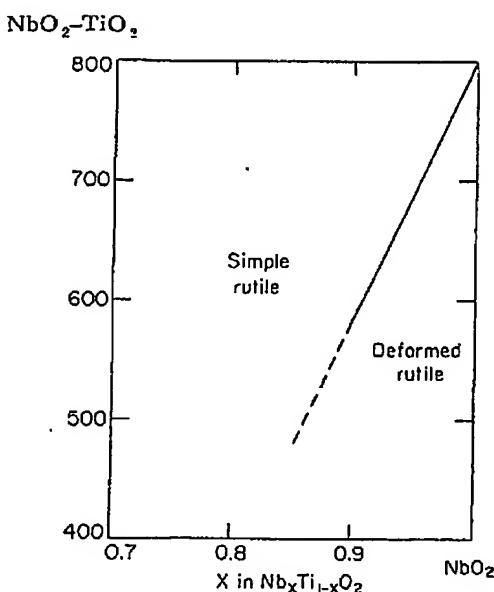


FIG. 4446.—System $\text{Nb}_x\text{Ti}_{1-x}\text{O}_2$, showing phase transition temperature.

K. Sakata, *J. Phys. Soc. Jap.*, 26 [4] 1067 (1969).

Five mixtures of NbO_2 and TiO_2 powders (purity unspecified) were prepared by sealing them under vacuum in a fused- SiO_2 tube and heating them for 1 day at 650° and 2 days at 950°. Phase analysis was conducted by means of X-ray diffraction and TA.

The entire system constitutes a continuous solid-solution series in which the normal rutile phase was identified for $0 < x < 0.85$ and the deformed rutile for $0.85 < x$ at room temperature. In the plot of lattice parameters as a function of composition, c shows a maximum, reflecting a competition between expansion caused by substitution of Nb^{4+} for Ti^{4+} and contraction resulting from the formation of $\text{Nb}-\text{Nb}$ pair bonds in the lattice. For $x = 0.85$, the X-ray diffraction patterns show superstructure reflections which characterize the deformed rutile-type structure, whereas by DTA no thermal effects were observed.

$\text{SiO}_2-\text{Ta}_2\text{O}_5$

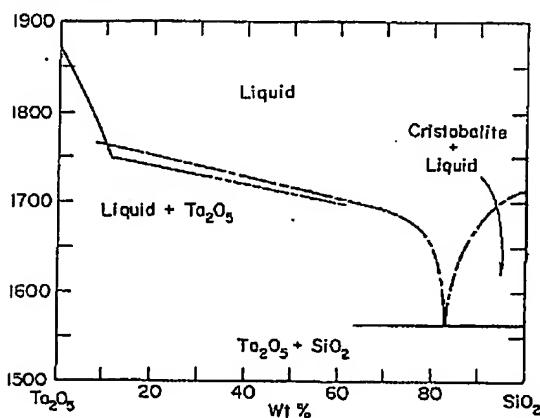


FIG. 4447.—System $\text{Ta}_2\text{O}_5-\text{SiO}_2$. Dash-dot curve is after E. A. Bush, Progress Reports Nos. 1 and 2, Department of Ceramic

Technology, Pennsylvania State University, University Park, PA, 1964.

D. A. Reeve and N. F. H. Bright, *J. Amer. Ceram. Soc.*, 52 [8] 407 (1969).

The liquidus curve near the Ta_2O_5 component was determined from data for 8 compositions using a Griffin-Telin hot-stage microscope modified for 2 kinds of noble-metal thermocouples, as described in the commentary to Fig. 4316. Starting materials consisted of silicic acid (Analyzed Reagent, J. T. Baker Chemical Co.) and Ta_2O_5 (Fansteel Inc., C-200) with a stated purity of 99.9%. Mixtures were homogenized by pelletization followed by sintering at 1500° for 48 h, with intermediate grinding.

The liquidus curve of Bush (determined by strip-furnace measurements) extrapolated to 100% Ta_2O_5 gives 1785°, which is the reported mp of the low-temperature form.¹ According to Ref. 2 (Fig. 4448), the addition of SiO_2 (as well as WO_3 , GeO_2 , B_2O_3 , and Al_2O_3) to Ta_2O_5 forms phases structurally similar to low Ta_2O_5 , which are stable up to solidus temperatures. An alternate explanation for the increased stability of low Ta_2O_5 is solid solution of the added oxides. The sharp discontinuity in the liquidus at $\approx 1750^\circ$ is consistent with either hypothesis.

1. A. Reisman, R. Holtzberg, M. Berkmanblit, and M. Berry, *J. Amer. Chem. Soc.*, 78 [18] 4514 (1956).
2. R. S. Roth and J. L. Waring, *J. Res. Natl. Bur. Stand., Sect. A*, 74 [4] 483 (1970).

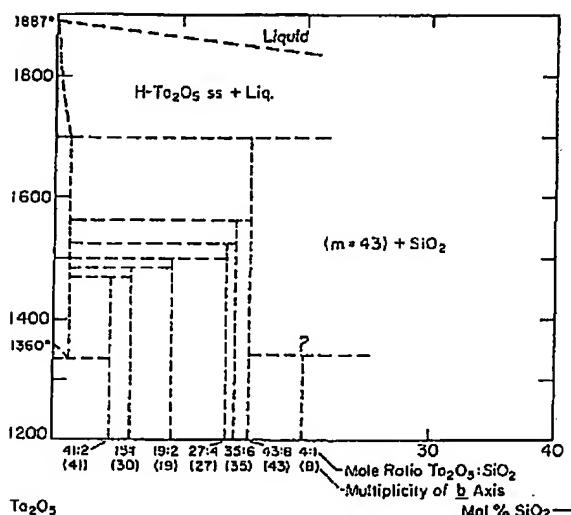


FIG. 4448.—System $\text{Ta}_2\text{O}_5-\text{SiO}_2$, showing Ta_2O_5 -rich region. R. S. Roth and J. L. Waring, *J. Res. Natl. Bur. Stand., Sect. A*, 74 [4] 487 (1970).

Except for the following modifications, the materials, methods, and interpretation are similar to those for the companion $\text{Al}_2\text{O}_3-\text{Ta}_2\text{O}_5$ system (Fig. 4380). Four compositions containing 5, 10, 25, and 50% SiO_2 (reagent grade) were prepared with the Ta_2O_5 by the solid-state method. Final heat treatments were done in sealed Pt tubes at temperatures between 1325° and 1595° for 4.5 to 65 h, before quenching and examination by X-ray diffraction powder techniques. Although not shown on the diagram, it should be noted that the data may also be interpreted on the basis of a conventional solid-solution phase diagram. Figure 4447 shows the liquidus for the entire system.

Phase Diagrams for Ceramists

Ernest M. Levin,
Carl R. Robbins and
Howard F. McMurdie

Compiled at the National Bureau of Standards

Margie K. Reser, Editor

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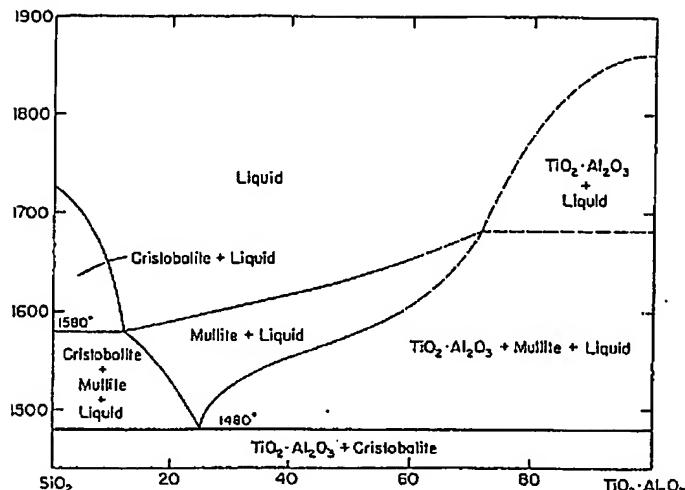
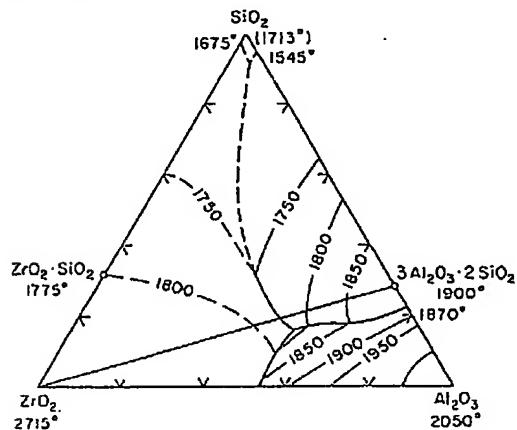
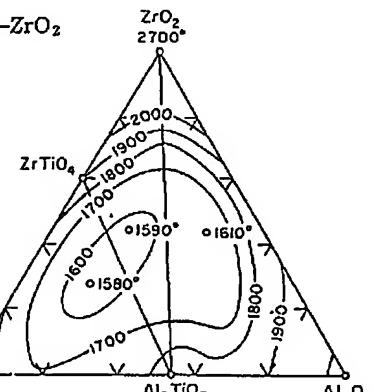
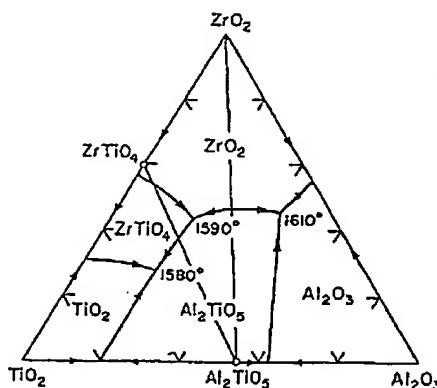
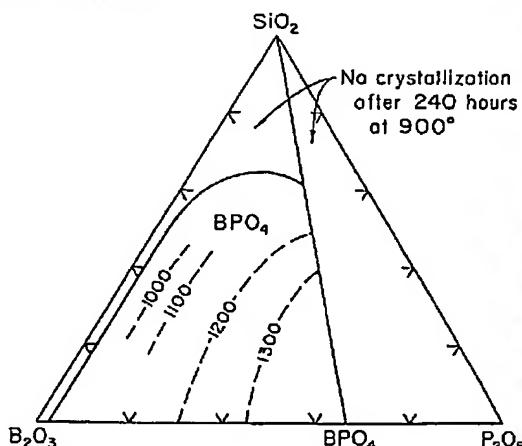
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figs. 771-775

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Metal Oxide Systems

 $\text{Al}_2\text{O}_3-\text{SiO}_2-\text{TiO}_2$ (concl.) $\text{Al}_2\text{O}_3-\text{SiO}_2-\text{ZrO}_2$ FIG. 772.—System $\text{Al}_2\text{O}_3-\text{SiO}_2-\text{ZrO}_2$.P. P. Budnikov and A. A. Litvakovskii, *Doklady Akad. Nauk S.S.R.*, 106, 268 (1956). $\text{Al}_2\text{O}_3-\text{TiO}_2-\text{ZrO}_2$ FIG. 773.—System $\text{Al}_2\text{O}_3-\text{TiO}_2-\text{ZrO}_2$; melting isotherms.A. S. Berezhnoi and N. V. Gul'ko, *Dopovid Akad. Nauk Ukr. R.S.R.*, 1955 [1] 78.FIG. 771.—System $\text{SiO}_2-\text{Al}_2\text{O}_3-\text{TiO}_2$.V. M. Agarnawi and J. White, *Trans. Brit. Ceram. Soc.*, 51, 810 (1951-52).FIG. 774.—System $\text{Al}_2\text{O}_3-\text{TiO}_2-\text{ZrO}_2$; primary phases.A. S. Berezhnoi and N. V. Gul'ko, *Dopovid Akad. Nauk Ukr. R.S.R.*, 1955 [1] 78. $\text{B}_2\text{O}_3-\text{SiO}_2-\text{P}_2\text{O}_5$ FIG. 775.—System $\text{B}_2\text{O}_3-\text{SiO}_2-\text{P}_2\text{O}_5$. Not true ternary at atmospheric pressure and temperature below 1400°C, because of retained water.W. J. Englert and P. A. Hummel, *J. Soc. Glass Technol.*, 39, 126T (1955).